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# CALIFORNIA HIGH-SPEED RAIL AUTHORITY

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## POLICY DIRECTIVE

POLI-PLAN-03

Approved By  
  
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Chief Executive Officer  
8-19-13  
Date

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**SUBJECT: Sustainability**

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### AGENCY POLICY

The California High-Speed Rail Authority (Authority) is taking a comprehensively sustainable approach to the design, construction, and operation of the high-speed rail system. The Authority has expressed this intent through a range of documents including Board of Directors adopted policies and partnerships with business and government stakeholders. This document presents an all-encompassing sustainability policy for the high-speed rail program. This document summarizes the Authority's sustainability objectives and specific sustainability commitments.

Sustainability represents the degree to which actions taken today enable current and future generations to lead healthy and rewarding lives. This definition implies that the actions taken now to meet current development and transportation needs must also consider how future generations will be able to meet their needs. It also implies a reluctance to bequeath financial and environmental hardship to the next generation.

To implement these ideals, sustainability is used as an organizing framework at the Authority, as other businesses, organizations, and projects have done. Consideration of current and future generations is a norm that permeates all aspects of the organization and every element of the project life-cycle.

While the Authority has several ongoing interrelated efforts that represent significant momentum, the Authority's intent in this document is to establish a comprehensive sustainability policy and framework that has clear priority areas and focuses on several specific goals.

This framework strategically allocates more resources and efforts toward and will enable more directed, creative, cost-effective approaches to achieving the Authority's sustainability objectives. Specific goals provide compass points toward which planning, design, and construction practices can be steered, and improve the clarity and focus of procurement documents. In addition, while there is recognition across the Authority and its delivery partners that sustainability is important, this policy provides clarity about specific priorities, objectives and principles as well as how sustainability affects specific disciplines.

## Background

The high-speed rail system will transform how Californians move and live throughout the state for decades to come. The Authority Board of Directors, legislators, stakeholders, and regulatory bodies have stressed that the project should exemplify sustainability in its design, construction, operation, maintenance, and management. It is vital that stakeholders are clearly aware of the sustainability priorities for the system and how these priorities will be achieved by the Authority and its delivery teams.

As previously noted, sustainability refers to the actions of current populations to meet their development needs without sacrificing the future generations' capacity to meet theirs. This sustainability ethic frames the Authority's approach to planning, designing, constructing, operating, and managing the high-speed rail system and its priorities and objectives seek to balance social, economic, and environmental issues. This approach will allow the Authority to capture value from sustainability activities and opportunities.

## Regulations & Mandatory Requirements

In its delivery of the high-speed rail system, the Authority will create many benefits for Californians through its partnerships with other California agencies and by carrying out its mandatory requirements.

The following section summarizes several of the laws and codes under which the Authority operates. This section also includes commitments and memoranda of understanding that the Authority has signed, committing it to partnerships and engagement with several stakeholders.

### Laws & Codes

**Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century (Proposition 1A) (2008).** Proposition 1a, which was approved by the voters of California in November 2008, contains several references that relate to sustainability:

“(g) In order to reduce impacts on communities and the environment, the alignment for the high-speed train system shall follow existing transportation or utility corridors to the extent feasible and shall be financially viable, as determined by the authority.

(h) Stations shall be located in areas with good access to local mass transit or other modes of transportation.

(i) The high-speed train system shall be planned and constructed in a manner that minimizes urban sprawl and impacts on the natural environment.

(j) Preserving wildlife corridors and mitigating impacts to wildlife movement, where feasible as determined by the authority, in order to limit the extent.”



**2010 California Green Building Standards Code (Effective January 1, 2011) (CalGreen Code).** Title 24 Part 11. CalGreenCode is the building code for residential and non-residential buildings. It has mandatory and optional elements that correspond to critical areas of high-performance design, construction, and operation. Design documents prepared by the Authority are required to meet CalGreenCode and Leadership in Energy and Environmental Design (LEED) requirements. While the project will be a statewide system—generally planned and designed in accordance with relevant state standards, regulations and codes—many system facilities will also require coordination with local jurisdiction design requirements.

**Assembly Bill 32: Global Warming Solutions Act (AB 32, Nunez).** This California state law, adopted in 2006, directs the California Air Resources Board (CARB) to begin developing solutions to reduce statewide GHG emissions to 1990 levels by 2020. The high-speed system is included as a transportation measure to help achieve statewide emissions reduction.

**Senate Bill 375: Sustainable Communities and Climate Protection Act (SB375) (Steinberg).** This California state law, adopted in 2008, requires CARB to develop regional reduction targets for GHGs, and prompts the creation of regional plans to reduce emissions from vehicle use throughout the state. California's 18 Metropolitan Planning Organizations (MPOs) have been tasked with creating Sustainable Community Strategies (SCS). The MPOs are required to develop the SCSs through integrated land use and transportation planning and demonstrate an ability to attain the proposed reduction targets by 2020 and 2035. The Authority's station area planning activities support and reinforce SCS planning.

**Assembly Bill 75: Waste Management for State Agencies (AB 75) (Strom-Martin).** This California state law, adopted in 1999, requires each state agency and each large state facility, as defined, to divert at least 25 percent of the solid waste generated by the state agency or large state facility from landfill disposal or transformation facilities by January 1, 2002, and at least 50 percent by January 1, 2004. Agencies must also designate at least one solid waste reduction and recycling coordinator to oversee the implementation of waste management plans and recycling/reuse programs and submit an annual report, for the prior calendar year, including disposal amounts and explanation of diversion activities. Reports are due by May 1 of each year. The business services manager at the Authority is the designated coordinator.

**The California Long-term Energy Efficiency Strategic Plan** was published in 2008 and updated in 2011 by the California Public Utilities Commission. It sets ambitious efficiency goals for the state, including achieving zero net energy new construction in the residential sector by 2020 and commercial sector by 2030. Setting a zero net energy goal for the design of high-speed rail facilities aligns the project with current California planning to achieve state energy targets.

**Senate Bill 1029, Budget Act of 2012.** This California state budget bill, which appropriated funding for the high-speed rail system, passed in July 2012. It directs the Authority to submit on or before June 30, 2013, a report approved by the Secretary of Business, Transportation and Housing, consistent with the criteria 'in this provision' that provides an analysis of the net impact of the high-speed rail program on the state's GHG emissions. This report was completed and delivered to the State Legislature and can be viewed at:

[http://www.hsr.ca.gov/docs/about/legislative\\_affairs/HSR\\_Reducing\\_CA\\_GHG\\_Emissions\\_2013.pdf](http://www.hsr.ca.gov/docs/about/legislative_affairs/HSR_Reducing_CA_GHG_Emissions_2013.pdf)

## Current Commitments

The Authority has signed the following Memoranda of Understanding and sustainability commitments.

**Memorandum of Understanding (MOU) for Achieving an Environmentally Sustainable High-Speed Train System in California.** In 2010, the Authority signed an MOU with partners at the federal and state levels pledging an environmentally conscious approach to the planning, design, construction and operation of the high-speed rail system.

The Authority, with the Federal Railroad Administration, U.S. Department of Housing and Urban Development (Region 9), U.S. Department of Transportation, and U.S. Environmental Protection Agency (EPA Region 9), established a partnership for sustainable system development.

The Sustainability MOU encourages the Authority to consider:

- The need to plan, site, design, construct, operate, and maintain a high-speed train system in California using environmentally preferable practices in order to:
  - Protect the health of California's residents and preserve California's natural resources
  - Minimize air and water pollution, energy usage, and other environmental impacts
- The signatory agencies also recognize the significant and far-reaching benefits of a well-planned system in California and share a common vision for a system that, when combined with other planning efforts to:
  - Promote sustainable housing and development patterns which recognize local goals and interests
  - Integrate station access and amenities into the fabric of surrounding neighborhoods
  - Stimulate multimodal connectivity and thereby increases options for affordable, convenient access to goods, services and employment
  - Reduce per passenger transportation emissions across California, thereby reducing associated environmental and health impacts
  - Protect ecologically sensitive and agricultural lands

The signatory agencies work together in six specific areas: sustainable livable communities; materials selection; design and construction; renewable energy and energy efficiency; water resource management; and the development of a systemwide sustainability policy.

This MOU was referenced in the 2012 Business Plan and is included in the Authority's procurement documents. The Authority's application of the MOU objectives are further refined and defined in this sustainability policy.

**MOU for the Development of Renewable Energy on State Property.** This MOU was originally adopted on December 15, 2010, by the California Energy Commission with the California Department of General Services, Department of Corrections and Rehabilitation, Department of Transportation (Caltrans), Department of Water Resources and the Department of Fish and Game. Later, the California State Lands Commission, the University of California, and California State University systems also signed the MOU (which includes an option for additional agencies to join in the future). The Authority became a signatory on April 2, 2012.

The MOU is effective through June 30, 2014. The signatories, working as a collective group, will study, plan, and develop energy-generating infrastructure on state government premises. They will work on a



consistent procurement strategy and contract language for Requests for Proposals (RFP) and develop one or more statewide RFP solicitations for developers of green power on state property.

**American Public Transportation Association (APTA): *APTA Sustainability Commitment*.**

The Authority signed this commitment July 2013.

APTA stresses that sustainability comprises practices that make good business and environmental sense, balancing the economic, social and environmental needs of a community. Signatories commit to a core set of actions that include the following:

- Make sustainability a part of the organizations strategic objectives.
- Identify a sustainability champion in the organization with the requisite human and financial resources and mandates.
- Establish an awareness-raising and education program on sustainability for agency staff.
- Undertake a sustainability inventory of the agency, reporting on some basic indicators, including: water usage, criteria air pollutant emissions, GHG emissions and savings, energy use, recycling levels.

All of the core set of actions have already been undertaken and will be reported on annually.

## **Policy Statement**

The Authority has developed and will continue to implement sustainability practices that inform and affect the planning, siting, designing, construction, operation, and maintenance of the high-speed rail system.

## **Commitment**

This policy compliments and reinforces the fundamental commitment to Californians and the goals expressed in the legislation enabling high-speed rail. The objective of the policy is to minimize impacts to the natural and built environment, maximize safety and reliability, encourage compact, walkable land development around transit stations, encourage ridership and revenue, and help California reduce resource consumption, traffic and airport congestion, and energy dependency in a life-cycle cost-effective manner. This policy leverages relationships with local and state agencies and federal partners, builds on global best practices of other high-speed rail operators, and further illustrates the Authority's commitment to its stakeholders. This policy lays out existing goals stemming from regulatory requirements, as well as broader targets for specific areas; the goals and priorities in this policy relate closely to other program goals, including quality, environmental mitigation and compliance, and safety.

## **Sustainability Priorities, Objectives & Principles**

The Authority identified five sustainability priorities, defined below.

- **Energy** refers to conservation of and the type of energy for rail operations and facilities
- **Station Communities & Ridership** refers to collaborative planning activities that promote transit-oriented development and sustainable land use decisions that will help bring riders into the system
- **Sustainable Infrastructure** refers to the set of principles and actions in planning, design, construction, and operation to accomplish infrastructure that reflect a balance of social, environmental, and economic concerns

- **Natural Resources** refer to protection of environmental resources as well as ecological systems
- **Business & Management** refers to responsible leadership and management as well as sound business planning

The following priorities and objectives are designed to advance the overall sustainability policy and correspond to specific actions the Authority will undertake itself or through work with partners. The objectives allow the Authority to set qualitative and quantitative targets and monitor progress; a specific plan for implementation and measuring progress will be developed by the Authority. Though it is not explicitly shown in the following table, some objectives support multiple priorities. In addition, as the Authority enters into contracts for the construction and implementation of the high-speed rail program, system-specific goals and strategies will be further refined in each contract's general and special provisions, sustainability strategies and procedures, and other documents as the system matures.

PRIORITY	OBJECTIVES
<b>Energy</b>	Reinforce a clean-energy economy through renewable energy. Strengthen public health by improving air quality. Reduce the consumption of non-renewable fuels to the maximum extent. Promote long-term price stability. Reduce Vehicle Miles Traveled (VMT).
<b>Station Communities &amp; Ridership</b>	Provide convenient station access and appropriate station interfaces to all high-speed rail station areas. Design and construct stations and infrastructure that reinforce Sustainable Community Strategies (SB375). Promote livable development patterns through partnerships. Reinforce quality of life through design of the built environment. Promote active transportation (walking and bicycling). Promote local and regional transit connectivity to high-speed rail stations.
<b>Sustainable Infrastructure</b>	Design, construct, and operate infrastructure in conformance with Authority principles for sustainable infrastructure. Design, construct and operate facilities that cost-effectively achieve State of California and local energy and green policies. Design, construct, and operate resilient systems and facilities (adaptation to changing climate). Protect employee and customer health during construction and operations.
<b>Natural Resources</b>	Minimize greenhouse gas (GHG) emissions. Protect, maintain, and restore ecosystem health. Protect and conserve agricultural land. Improve air quality. Protect, maintain, conserve, and restore wildlife corridors and habitat.



**Business & Management**

Improve the economic value to Californians from the system.  
Achieve a self-sustaining financial structure.  
Achieve continual improvement of delivery and management.  
Operate and maintain transparently and accountably.  
Maximize opportunity for private investment.

### Authority Principles for Sustainable Infrastructure

The California High-Speed Rail Program will provide critically-needed new transportation infrastructure for Californians and the Authority is committed to ensuring it is implemented in a sustainable manner. Sustainable infrastructure can refer to a variety of priorities and objectives, so it was important for the Authority to define its sustainable infrastructure principles. The Authority also considered on global best practices, stakeholder priorities, and California state regulations to develop these principles. The following principles encompass the Authority's commitment to sustainable infrastructure:

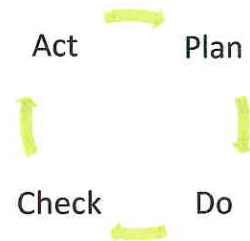
- Make energy efficiency a priority in design.
- Use 100 percent renewable energy for operation.
- Minimize GHG emissions through design and in construction.
- Design and construct high-performance facilities.
- Maximize station access for pedestrians, cyclists, and transit riders.
- Minimize carbon intensity (embodied carbon) of major materials while maintaining durability and quality.
- Make the use of non-hazardous materials a priority.
- Investigate appropriateness of groundwater recharge along the alignment and make it a priority where appropriate.
- Make groundwater recharge at sites a priority and/or detain water for reuse in irrigation, while maintaining water quality.
- Progressively refine requirements in design and construction contracts to achieve improved outcomes.
- Sequester in-situ hazardous material (where feasible and cost effective).
- Follow construction-waste practices that divert 75 percent from landfill, unless the local regulation is higher.
- Recycle all steel and concrete.
- Follow construction practices that maintain or improve air quality during construction, both for workers and people living in the air basin in which the project is being constructed.
- Follow operations practices that maintain or improve air quality.
- Make life-cycle performance of components, systems, and materials a priority.
- Adaptively reuse existing structures and facilities whenever feasible.

### Application

The Authority will apply its sustainability policy across all aspects of the design, construction, operations, and governance of the high-speed rail program.

The Authority is developing a *Sustainability Framework Implementation Plan* (forthcoming) to clarify how sustainability priorities will be embedded in future procurement documents, technical memoranda, design criteria, and Authority business planning and operation. This policy and the implementation plan will be communicated to all parties involved in program implementation to ensure that decision-making incorporates sustainability in a timely fashion and that sustainability is integrated without schedule disruptions or cost escalation. Elements of success include the following:

- Clearly understanding the system’s sustainability requirements throughout the Authority and its delivery team.
- Communicating and incorporating the above requirements into design, analysis, scopes of work, and procurement documents.
- Clearly understanding the sustainability actions required in the delivery of the system by the Design-Build (DB) contractors.
- Tracking key performance indicators throughout the design, construction, and operation to establish baselines for continuous improvement.
- Attention during the design and construction procurement process to ensure that critical decisions are carried through, implementation is monitored, and performance is measured using indicators that can be clearly communicated to stakeholders.



## Financial Impact

Incorporating sustainable design and construction practices, as well as renewable energy development and deployment, into a project or program can involve a higher up-front capital investment than more traditional business-as-usual practices. The Authority has factored potential renewable energy costs and premiums for facilities that will achieve a level of high-performance design into its cost estimates. The benefits of these sustainability investments may not necessarily be reflected in the system’s initial capital investment. Rather, the benefits will be realized in reduced ongoing operating and maintenance costs for these facilities. The Authority will prepare life-cycle cost analyses that reflect the range of co-benefits and potential future savings associated with its sustainability practices which will demonstrate the equivalent net-present values of sustainable strategies compared to business-as-usual practices. The Authority is committed to pursuing sustainability strategies and a renewable energy procurement method that will be as close to cost-neutral as possible or that will have positive operating cost effects.

## Related Documents

The purpose of this document is to describe the Authority’s sustainability policy and its sustainability priorities and objectives. Supporting policies, procedures, actions, and monitoring and reporting methods that implement the Authority’s policy will be presented in the *Sustainability Framework and Implementation Plan* (forthcoming). The implementation plan will also include specific design criteria for energy, indoor air quality, and water performance to ensure that Authority facilities will achieve performance expectations.



## Reporting

The Authority will produce a sustainability report annually. Following the example of peer organizations (high-speed rail agencies and major transportation agencies) the report will contain a subset of indicators recommended by the Global Reporting Initiative (GRI). If required by regulation or other stakeholder interest, the Authority will undertake the steps and procedures necessary to enable its environmental and sustainability claims to be audited and verified in compliance with the International Standards Organization (ISO) 14001 standard.

The Authority has included general references to sustainability in its planning, design and construction documents, and placed specific requirements in the contract for design-build services. The general statements will be built upon to create cost-effective, high-speed-rail-specific implementation strategies, detailed in the forthcoming plan, and undertaken by various divisions of the Authority and its consultants. The contract requirements will be undertaken by the design-build contractor and will be monitored throughout construction. Performance data will be collected through the Authority's Environmental Mitigation Monitoring Assessment (EMMA) database. This data, as well as Authority performance information will be assembled into the annual report.

## References

### California State Legislation

- 2010 California Green Building Standards Code (Effective January 1, 2011) (CalGreen Code), Title 24 Part 11.
- Assembly Bill 32: Global Warming Solutions Act (AB32).
- Assembly Bill 75: Waste Management for State Agencies (AB 75).
- Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century (Proposition 1a) (2008)
- Senate Bill 375: Sustainable Communities and Climate Protection Act (SB375) (Steinberg), 2008
- Senate Bill 1029, Budget Act of 2012, July 2012

### Sustainability Reports

- Rail and Sustainable Development, International Union of Railways (UIC), 2010.
- Railways and Sustainable Development – A Global Perspective, UIC, May 2012
- Sustainability Report, Deutsche-Bahn Group, 2009
- Sustainability Policy and Report, Los Angeles Metro, 2011
- Sustainability Policy & Report, Network Rail, 2010
- Sustainable Development Strategy, Olympic Delivery Authority, 2006
- Sustainability Report, Société Nationale des Chemins de Fer Français (SNCF), 2009
- Transit Sustainability Practice Compendium, American Public Transit Association, US Environmental Protection Agency, April 2009
- Tread Lightly Report, Eurostar, 2009

### Memoranda of Understanding

- Memorandum of Understanding for Achieving an Environmentally Sustainable High-Speed Train System in California, July 2010
- Memorandum of Understanding for the Development of Renewable Energy on State Property, Adopted 2010, Signed by Authority 2012
- APTA Sustainability Commitment.



## Definitions

Terms below are used in this policy or will be used in subsequent sustainability documents.

**Biomass:** Plant material such as trees, grasses, and crops that can be converted to heat energy to produce electricity.

**CalGreenCode:** CalGreenCode is the building code for residential and non-residential buildings.

**Carbon Neutral:** A term describing a process by which carbon dioxide (CO<sub>2</sub>) emissions are identified, inventoried, and managed (reduced and/or offset) in a product, process or action over its life cycle to ensure that there is no net release of (CO<sub>2</sub>).

**Carbon Offsets:** Carbon offsets are emissions reductions that have been made elsewhere, which are then sold to the entity that seeks to reduce its impact. To become carbon neutral, it is important to have an accurate calculation of the amount of emissions that need to be offset, thus requiring the calculation of a carbon footprint.

**EcoDistrict:** An EcoDistrict is a neighborhood or district with a broad commitment to accelerate neighborhood-scale sustainability. EcoDistricts commit to achieving ambitious sustainability performance goals by guiding district investments and community action, and tracking the results over time.

**Embodied Energy/Embodied Carbon:** Embodied energy is the total primary energy consumed during the lifetime of a product, from extraction of raw materials, including fuels, to the end of a product's lifetime. Different boundaries include the following:

- **Cradle to Grave:** Includes energy from manufacturing, transport, energy to manufacture capital equipment, installation, deconstruction, demolition and disposal.
- **Cradle to Gate:** Energy, in primary form, until the product leaves the factory gate.
- **Cradle to Site:** All energy consumed until the product has reached the point of use.

**Fuel Cell:** A technology that uses an electromagnetic process to convert energy into electrical power. Often powered by natural gas, fuel cell power is cleaner than grid-connected power sources. In addition, hot water is produced as a by-product that can be used as a thermal resource for the building.

**Greenhouse Gas (GHG):** A gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds (ISO 14064-1:2006(E)). GHGs include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF<sub>6</sub>). GHG emissions are commonly converted into carbon dioxide equivalent (CO<sub>2</sub>e) based on their 100-year global warming potential. This allows a single figure for the total impact of all emissions sources to be produced in one standard unit.

**Leadership in Energy and Environmental Design (LEED):** LEED certification provides independent, third-party verification that a building, home, or community was designed and built using strategies aimed at achieving high performance in the following key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

**Life Cycle Assessment (LCA):** An LCA evaluates the environmental effects of a product or activity holistically, by analyzing the entire life cycle of a particular material, process, product, technology, service or activity.

**Life Cycle Cost:** The amortized annual cost of a product, including capital costs, installation costs, operating costs, maintenance costs, and disposal costs discounted over the lifetime of the product.

**Living Buildings Challenge:** A program of the International Living Future Institute. This concept is a philosophy, advocacy tool and certification program that addresses physical development at all scales. It comprises seven performance areas: Site, Water, Energy, Health, Materials, Equity, and Beauty. These are subdivided into 20 imperatives, each of which focuses on a specific sphere of influence. The emphasis is on absolute performance metrics, such as net-zero water and energy, as a means of assessing performance of a building or neighborhood.

**Net-Zero Energy (or Zero-Net Energy):** Net-zero (or zero-net) energy refers to a facility or system that produces as much energy as it uses over the course of a year (or other defined period), and most commonly applies to buildings. A net-zero energy building is very energy efficient. The remaining minimal energy needs are typically met with on-site renewable energy.

**Photovoltaic (PV):** PV devices use semiconductor material to directly convert sunlight into electricity. Power is produced when sunlight strikes the semiconductor material and creates an electric current.

**Post-consumer recycled content:** Post-consumer material is material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item.

**Pre-consumer recycled content:** Pre-consumer material is material diverted from the waste stream following an industrial process, excluding reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process. Synonyms include post-industrial and secondary material.

**Recycling:** The series of activities—collection, separation, and processing—by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion.

**Renewable Energy:** Energy resources such as wind power or solar energy that can be produced indefinitely without being depleted.

**Sustainability:** Sustainability is the capacity to endure. Practical application of sustainable thinking recognizes how current decisions affect the capacity of current and future generations to lead healthy and rewarding lives.

**Sustainable Transportation:** Transportation that does not rely on the use of fossil fuels.

**Volatile Organic Compounds:** VOCs are chemicals that contain carbon molecules and are volatile enough to evaporate from a material's surface into indoor air at normal room temperatures (referred to as off-gassing). Examples of building materials that may contain VOCs include, but are not limited to solvents, paints, adhesives, carpeting, and particleboard.